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FOREST SERVICE

MONTHLY REPORT OF THE OFFICES OF FOREST EXPERIMENT STATIONS AND DENDROLOGY

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MONTHLY REPORT OF THE OFFICES OF FOREST EXPERIMENT STATIONS AND DENDROLOGY

October, 1925

FOREST EXPERIMENT STATIONS

Washington

Mr. Clapp returned the end of October after a swing around the circle, during which he visited the Forest Products Laboratory and all of the Forest Experiment Stations except the Southwestern. He was in Washington but a very short time before it was necessary for him and Shepard to take in the Denver conference at which they will represent the Branch of Research. Munns was out all the month in Districts 3 and 5 and returned to Washington during the first of November.

The Section of Forest Measurements lost two of its computers this month through resignation. Both Mrs. Chapin and Miss Kerbaugh have been in the Section of Measurements for several years. Their places have not yet been filled.

During the month the Section of Forest Measurements spent the greater part of its time upon the southern pine growth study rechecking the volume tables in order to eliminate some of the early errors and to incorporate new data. Additional time was spent on a variety of work including the western yellow pine volume table, the tupelo study of the Southern Station, and the Douglas fir yield study for the Pacific Northwest.

In the Tabulating Division the big job of handling accounts was completed and the annual summary finished up for all the Districts. Other work in the division included the stumpage and log price studies for Forest Economics.

Library

In October the library loaned 820 books and periodicals, and 116 members of the Service and others consulted the library in person.

The number of books and articles indexed for the card catalogue last month was 247.

EDITOR'S OFFICE

Tables

There are at least four distinct varieties of tables, and this is a fact not generally recognized. Consequently, advice on how to construct tables, or rules governing their construction, are as like as not to hit wide of the mark. The Bureau of Agricultural Economics recently evolved a mimeographed manual of table construction that is admirable in its way, but it has only a very slight bearing upon the construction of such tables as generally appear in forest experiment station bulletins. It is intended to cover statistical tables only, for this is practically the only kind with which that particular bureau deals. Experiment station bulletins, on the contrary, rarely, if ever, deal in statistical tables.

Without splitting hairs too fine, the four distinct kinds of tables claimed may be classified as (1) statistical tables, (2) enumerative or list tables, (3) instrumental or functional tables, such as log tables, or yield and volume tables, and (4) (a decidedly miscellaneous class) illustrative tables. There are 782 tables in the statistical appendix of the Agriculture Yearbook for 1924, and 773 of them, to the best of my observation, are statistical tables. The six freight rate tables (734-739) and the three meteorological tables (780-782) are enumerative tables. The statistical tables can be totaled and averaged, compared by years or regions or some other classification, and combined with like tables for other years, regions, products, sources, etc. The enumerative tables cannot ordinarily be so used, and are mainly matters of record.

The instrumental or functional table would seem to explain itself, but an example came to hand recently of the confusion of functional and enumerative tables. In a bulletin on red alder now in preparation the authors presented average measurements from about 20 different experimental plots of this species and called it a "yield table." It was, however, in no way functional, but rather a mere list of plots. The authors' attempt to average the 20 plots was unjustified, for the factor of site was not even considered. The table could not be made use of in any computations of yield. It merely set out in detail the data observed; as an enumerative table there could be no objection to it.

Enumerative tables may, of course, present averages and totals. Table 15 in Hoffman's bulletin (No. 1200) is totaled, but this and all the other tables in the bulletin are merely enumerative. Table 18, indeed, is hardly that, and the present editor recommends that such lists of names and regions where found, while they must be ruled up on the page, be presented without table number, simply as text tables.

Practically all of the tables ordinarily presented in experiment station bulletins are enumerative tables or illustrative tables. The illustrative variety, indeed, is quite likely to be a form of enumerative table. It is generally a derived table, selecting only such data, whether statistical or mere matters of record, as best illustrate the text. Such tables adhere fairly closely to the subject matter of the bulletin in which they appear and cannot easily be lifted out for use elsewhere. I have placed them in a distinct class, not because of a difference in kind so much as a difference in use. They need more space for definition than is available this month.

Classification and subclassification of tables or any other phenomena is a silly business unless it leads to a clarifying of ideas and precision of statement. The example given of the table in the red alder bulletin indicates that some idea of the classes that tables may fall into is helpful to the author. The apparent assumption on the part of its compilers that the memorandum on tables issued by the Bureau of Agricultural Economics might be standard for all activities of the Department is another indication of the need for such classification. More of this, as they say in the historical novels, anon.

NORTHEASTERN FOREST EXPERIMENT STATION

The close of October finds most of the field parties returned for the winter. The continued stormy weather forced Stickel to gather together his meteorological instruments and return to the office about the 21st of the month. Westveld, who had been winding up his season's work in the Adirondacks, made his appearance ten days later. Behre, who has been working along the southern coast of Maine, is at present headed toward Amherst.

Spaulding and Meyer spent several days in October on the Cherry Mountain sale area in the White Mountain National Forest looking for suitable localities in which to start a slash rot study. Several plots were laid out on which a number of species, such as yellow birch, beech, red spruce, balsam, and some hard maple were well represented. Lopping and not lopping with scattering and piling irregularly under each method will be the mode of slash disposal. A study of the agencies of decay and rate of rot under the various conditions, together with a study of the character of the reproduction under these differing circumstances, is to be made following the cutting. A foot or two of snow on the ground prevented a detailed study of existing reproduction.

Stickel was assisted during the month of September and October by R. C. Hall, field assistant, who will also assist in fire compilation work during the winter. Weather conditions during September and October were exceptionally poor for the study of meteorological factors and forest fire hazard, since during September there were twenty-two days in which

measurable rainfall was recorded. The abnormally early winter season, with several snowstorms during the first two weeks of October, terminated the field work of the fire project for this year. In general, the field season was not conducive to the fire weather project. However, in spite of the adverse weather with its fifty-two rainy days out of a total of eighty-four field days, a preliminary summary of the data shows that relative humidity is the one factor which follows most closely the curve of moisture content of the top duff layer. It also indicates that the barometer is of value in indicating the trend of the weather rather accurately. It is planned to place the fire weather data on punch cards so that they may be further analyzed.

Westveld checked over the permanent sample plots on the White Mountain National Forest en route to the Adirondacks region. These plots were cut over during the winter of 1924 and 1925. An examination at the close of the growing season revealed a considerable growth of raspberry bushes. In skid trails in some instances specimens of raspberry bushes were found over two feet in height. On the selection cutting plot on which the most conservative method of cutting was employed, very few specimens over one foot in height were noted. The striped maple and mountain maple, both of which are weed species, show very vigorous growth. Many of the striped maple seedlings which were only six inches in height at the time the cutting occurred show from six to fifteen inches height growth the first growing season following logging. Although many fire cherries are becoming established, nearly all of the specimens noted were found to be severely grazed by deer. Very few specimens of spruce and fir seedlings and saplings show any accelerated height growth the first season following cutting.

Dana spent most of the month on current office work and on the minimum requirements and fire studies. In connection with the latter, he gave a talk concerning the work of the Station at a meeting of Massachusetts state firewardens and men in charge of state forests. Considerable interest was shown in the work. In connection with the requirements study, a trip was made to parts of New Jersey to round up the information necessary for adequate treatment of that state.

ROCKY MOUNTAIN FOREST EXPERIMENT STATION

October Activities

The end of October found the field work by Roeser and Bates completed in very good shape and the time at hand for office work upon the data obtained during the season.

Roeser's activities during the month were quite diversified, but were concentrated on four main lines. Considerable time was spent in handling cones and extracting seed in Douglas fir seed production studies, the trees which have been locally under observation for several years all

bearing quite heavily this year. It is noted, however, that while vast numbers of cones matured, they are of unusually small size, probably due to overloading of the trees.

Mapping of station areas cut over in the past was practically completed and data are now available to compute what our cutting requirements have been during several years, and to make a plan which will satisfy future requirements. Several days were spent with Robertson in felling the "shelterwood" stand in the Douglas fir plot which was originally cut over in 1913-14, great care being necessary to avoid injury to the seedling crop. For its further protection, skidding will be delayed until there is a good blanket of snow.

All hands were busied for a few days to rebuild the cone storage shed, which is coming into increased use owing to the development of projects in which small, special seed collections are a factor. The old shed was a converted woodshed and owing to faulty construction it was impossible to make it wholly mouseproof. We now defy the entire rodent world.

Bates was in the office from the 7th to the 9th with Mr. Clapp going over many matters of policy, and settled down to office work after the 22nd, but spent the first half of the month largely on the transpiration tests which have been running during the past summer. Although there were disappointing losses among the trees potted last spring, quite a variety of results were obtained from the survivors, and new insight obtained on the problem of transpiration, which will aid in a re-interpretation of the results obtained in the past. On the basis of all data secured to date we are now prepared to state the water requirements of the main species approximately as follows:

Limber pine.....	1,000	grams	for	each	gram	of	new	dry	weight
Yellow pine	900	"	"	"	"	"	"	"	"
Bristlecone	800	"	"	"	"	"	"	"	"
Lodgepole	725	"	"	"	"	"	"	"	"
Pinon	580	"	"	"	"	"	"	"	"
Douglas fir	550	"	"	"	"	"	"	"	"
Engelmann spruce	450	"	"	"	"	"	"	"	"

These figures are generally lower and show less spread between the species than those heretofore published, since we have learned the cause of exceptionally high figures in some instances.

Plans for the extension of this study under more natural growing conditions, on a basis of equal areas (of soil and leaf) for the various species, progressed satisfactorily.

Computations of the Wagon Wheel Gap streamflow results for the year ending September 30 show a steady progress back to normal of the

streamflow from the denuded area, undoubtedly resulting from the development of the aspen cover. This steady progress has occurred despite the fact that during the past three years the highest and lowest amounts of precipitation have been recorded. The trend of results indicates that all of the most critical effects of denudation will have been obtained in another year, and that the intensive phase of the experiment may then be closed unless it is desired to create a further serious disturbance. There are no certain effects of the light grazing carried on this summer and it seems practically out of the question to do anything with fire because of a lack of fuels sufficient to kill the aspen sprouts.

The Station was favored by a visit on the 25th to 27th of Dr. Lloyd Austin, who is undertaking probably the most extensive and intensive tree-breeding work ever attempted. Dr. Austin agrees with our viewpoint, to which Mr. Clapp has also acceded, that regardless of any extremely comprehensive work which is attempted, there are many problems in each region which must be attacked as breeding problems, that the solution of these is a practical undertaking, and that because of the more or less fortuitous nature of any progress made, no opportunities for beginnings should be overlooked.

November Plans

Roeser will be engaged largely on summing up M-1 data and preparing a plan for future cutting in the Station forest, with the probability also of a week's work at the Station necessitated by Robertson's absence.

After completing a current report on Wagon Wheel Gap, Bates will turn to a revision of the lodgepole seed report, including incorporation of the 11-year germination results recently obtained. As soon as this is done, attention will again turn to the bulletin on forest growth.

SOUTHWESTERN FOREST EXPERIMENT STATION

On October 1, Marsh, Munns and Pearson started on an automobile trip across the Coconino and Tonto National Forests, visiting Roosevelt dam, the Boyce Thompson Southwestern Arboretum, and returning by way of Phoenix and Prescott. The primary purpose of the trip was to investigate the erosion problem. Erosion is very serious in practically all of the country below the yellow pine type, and in places the yellow pine is not exempt. Overgrazing is by far the greatest factor involved. This is primarily an administrative problem rather than a research problem. Supervisor Swift is obtaining information on the depth of sediment deposited in the Roosevelt reservoir. The Salt River water users are making a detailed survey of the reservoir. It is believed that when these figures become available the water users will demand drastic action.

On the return from Phoenix to Prescott, Munns was treated to a real demonstration of what an Arizona "dry" river can do after a rain. The Hasayampa washed out the approach to a steel bridge at Wickensburg, necessitating our return to Phoenix. The next day the trip to Prescott was made over the Black Canyon route. Marks of high water were everywhere in evidence, and for a distance of 20 miles the road was washed down to the rocks.

Pearson spent two days on the Walnut Creek district of the Prescott studying the relation of grazing to brush and grass. This district has been severely overgrazed in the past but now all the allotments are fenced and the District Ranger has made substantial progress in reducing the number of cattle. No sheep graze on this district. It is evident that much of this country which is now almost devoid of grass had considerable grass before the day of overgrazing. The most remarkable thing about this region is the way Utah Juniper is reproducing. It is not only restocking juniper lands but it is invading large treeless valleys, covering thousands of acres. If fires are kept out it will be only a matter of about 20 years until the junipers will have solved the grazing problem.

Kranch, assisted by Junior Foresters MacIntyre and Beckstrom of the Coconino has remeasured sample plots on the Datil and the Coconino. He is now establishing a new plot of 160 acres on the Tusayan.

Mr. Sigurd Ehrenburg, a forester from Sweden, spent a week at the Experiment Station. He visited two timber sales, saw several sample plots, and climbed the San Francisco mountains up to the spruce type. He states that forest conditions here are in many ways similar to those of northern Sweden, where drought rather than cold is often the limiting factor. While in Flagstaff, Mr. Ehrenburg addressed the Rotary and Hiram Clubs, giving interesting short talks on forestry and its important relation to community life in Sweden.

PACIFIC NORTHWEST FOREST EXPERIMENT STATION

October has been divided about equally between field and office work, though the weather has been perfect for the former throughout the region. In anticipation of a full house during the winter another small room was engaged November 1.

McArdle has spent practically the entire month supervising and helping with the computations for the Douglas fir yield study. The total basal areas of 2050 plots have been figured and these averaged by tracts. On the basis of twice the standard deviations, approximately 5 per cent of the 2050 plots were discarded as subnormal or abnormal. Considerable progress has been made in combining the remaining plots in each tract to form composite plots, of which there will be 261.

Westveld was on the Whitman Forest all the month studying brush disposal practices on private lands and on Government sales. Several large plots were put in to see the results of broadcast burning, no burning, and piling and burning. He finds that where there is no burning disintegration is more rapid in the Blue Mountain region than in central Oregon, and raises the question whether this is not due to more grazing in the former region. Westveld finds that where the snags have been felled prior to burning the piled brush there is more damage to reproduction and more danger of fire spreading, because of the fire traveling along the dry down snags. The State Forester's office is concerning itself with standardizing yellow pine brush disposal requirements and a representative of his office called last week to find out our ideas on the subject.

Isaac spent practically the entire month in the field. The measurement of a series of Snoqualmie plots completed the biennial examination of the Douglas fir seed study plantations. Several days were spent in the vicinity of Darrington on a survey of the number of snags left standing on two or three private lumbering operations. Final examinations of the Douglas fir germination and survival plots on the Cascade Forest were made and the two seed-tree survival plots in that locality were also examined. At Wind River two new series of seed storage tests were installed, one under virgin timber and one in a fresh burn in the open. Each series contained five lots of seed mixed with duff and contained in rodent-proof cages. These were buried and one sample will be taken up each year for five years to test the viability of the seed stored in these conditions, which simulate Nature's storage.

The Director has attended a number of meetings. Early in the month was the Fifth Annual State Forestry Conference under the auspices of the Seattle Chamber of Commerce at which he read a paper on "The Need for Forest Research by the State." Last week he represented the Yale Forest School at the dedication of the new "Alfred H. Anderson Hall" of the College of Forestry of the University of Washington. Mr. Zon there gave the principal address. The Logging Congress was attended two of its three days, after which Zon and Munger returned to Portland.

At the invitation of the Long-Bell Lumber Company the Director visited near their logging town, Ryderwood, a demonstration of a new fire pump just assembled by them. It made a remarkably satisfactory performance and promises to be another useful agent in keeping down the fire menace.

A trip was made with the President of the C. W. Stimson Timber Company to view his logged-off lands and operation in the Hoods Canal country. He was curious to know what were the possibilities for reforestation. Everything was favorable except the exceedingly poor soil that promises much smaller yields than most Douglas fir land.

At the hearing before the Interstate Commerce Commission, where the Northern Pacific interests and the Southern Pacific interests were staging a battle royal over the former's petition to build into south central Oregon, Munger was called to testify for the Northern Pacific regarding the possibilities of sustained yield and rate of growth of yellow pine. The Northern Pacific counsel wanted to show that the region had possibilities for continuous tonnage after the present mature timber was cut.

DISTRICT 5, CALIFORNIA DISTRICT

Work on the remeasurement of the permanent sample plots in the Methods of Cutting series continued. A 24-acre plot on the Plumas, a 10-acre plot on the Tahoe and a 6-acre plot on the Sierra National Forests were completed, leaving only two plots of the series yet to be done.

Both Show and Dunning appeared as instructors at the Ranger School, which is holding its sessions at the Feather River Experiment Station. Show gave 1½ days work on fire, and Dunning contributed to the timber sale practice work.

The timber growing and logging practice report for the redwood region was revised by Show and sent to various agencies for comment.

Munns paid a visit to the office near the end of the month.

NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Except for the last few days of the month, October this year gave us wonderful weather for field work. Most lines of work were continued in the field throughout the month. Owing to the great amount of time lost to regular work through fire fighting during the summer, we were particularly grateful for the favorable weather this fall. On the other hand, the usual early loss of our field assistants was more keenly felt than ever before. With a field season extending from May to October and using forest school students, who are available for July, August and September only, we are annually confronted with this problem of getting help for three or four weeks at both the beginning and end of the field season. Sometimes we get fire guards going off duty who are willing to work for the short period we can hire them. It is not always possible to find men of this type suitable for the work. Sometimes we are fortunate to find a student staying out of school. This fall we were unable to get anyone. The effort to get short-period assignments of technical men from several of the Forests was unsuccessful, although two Forest Supervisors were in sympathy with the suggestion. This is usually the season when the Forests have an overload of field work which must be done, such as slash burning, timber marking, etc.

The methods-of-cutting study was conducted on old timber sale areas throughout the month. Except for the help of one field assistant for the first few days of October, Haig and Marshall were engaged in the work alone. The first two weeks of the month were spent in a continuation of the study on the Coeur d'Alene Forest and the last two weeks on the Kaniksu Forest.

The most interesting sale studied early in the month contained an area of 700 acres on which all the larger hemlocks and white firs had been girdled six years ago. The object of girdling on timber sales in the western white pine type, which is practiced extensively on the Coeur d'Alene Forest and to a less degree on the Kaniksu Forest, is to remove the defective and low value inferior species so as to encourage the regeneration of white pine. Hemlock and white fir are very common and aggressive associates in stands with white pine, larch and Douglas fir. There is practically no market for them. If left alive on the ground their shade and their own prolific powers of regeneration prevent the reproduction of white pine. On this particular area about 60 hemlocks and white firs per acre had been girdled. Although the practice has resulted quite successfully here in allowing a good crop of white pine reproduction to get started, another less desired result is beginning to show up in a very threatening way. This is the gradual accumulation on the ground of fallen limbs, tops and trunks of girdled trees. This happening has been anticipated in a general way by many Forest officers, and has been frankly objected to by the fire specialists on the ground that the practice thus defeats the ends of slash disposal and fire protection. On the area in question the accumulation of debris is well on the way to forming a very considerable fire menace.

The general observation resulting from the study of old sale areas to date, namely, that the best reproduction follows some form of clean cutting, whether strip, group, or seed trees, was given further support by the study of an area on the Kaniksu Forest. This was a clear cut area of 60 acres, on the windward side of which a 6½-acre group of seed trees was left standing. To the south of the sale, there was a private cut-over area and to the north and east no timber whatever. The cutting was done 14 years ago and the slash burned broadcast in the spring of the year. A transect run the length of the area gave a total of 13,717 seedlings per acre, of which 4,300 were white pine, 7,400 cedar and 2,017 other associated species. The most striking feature of this reproduction was its unusually excellent growth. The dominant saplings were 15 feet in height and 2 to 3 inches in diameter.

Another interesting sale area on the Kaniksu Forest visited in this study was the famous Section 8 which is reputed to have contained the heaviest stand of white pine timber on this Forest. On this sale practically all the slash was left on the ground, some of it piled and unburned, but most of it undisturbed as it fell. Transects here gave the following preliminary results:

Condition	Per cent of area covered with slash	Amount of reproduction per acre			
		Wh. pine	Cedar	Other	Total
Slash left untouched	41	425	1,000	4,000	5,425
Slash left in piles	22	1,100	6,000	3,250	10,350

Weidman and Kempff spent a week on the proposed experimental center in the Coeur d'Alene Forest. Sample marking in a 100-year old white pine stand was done preliminary to establishing several permanent methods of cutting plots in this age class. A timber sale now in operation adjacent to this stand makes it possible to do experimental cutting here at the present time. The stand is very dense and on but a moderately good site, and the timber is therefore not as large as it is sometimes found at 100 years of age. Although it is not merchantable under present standards here, it will be in the future, and certainly would be now if it were in the East. It is proposed to put in one plot employing a shelterwood method and one employing a clear cut with seed trees.

Another interesting experiment for which the initial work was done on the Coeur d'Alene area dealt with making a release thinning in a dense reproduction stand. This reproduction is 20-25 years old and has a density of 34,000 per acre. The height of dominants is chiefly between 5 and 8 feet, though there occasionally are trees up to 15 feet or taller. A preliminary compilation shows that hemlock makes up about 85 per cent of the stand, white pine about 7 per cent and white fir about 8 per cent. The idea is to free the white pines by cutting out the hemlocks crowding in on them. This is very similar to cultural operations of this sort that have been carried out successfully for several years by Professor Fisher on the Harvard Forest. The chief object here is to see whether it will not be possible early in the life of the stand to accomplish less expensively what is now done at maturity at a high cost, namely, girdling and slashing of the inferior species to keep a high proportion of white pine in the stand.

Gisborne devoted most of the month to the revision of his progress report on project RS, Pf, B-5. Considerable time also was required for the collection of a series of photographs of Forest Service inventions which will be used in the illustration of an article for American Forests & Forest Life.

Three experimental plantations were made this fall at Savenac Nursery: (1) 2,000 four-year-old Engelmann spruce seedlings were planted for the project dealing with stimulation of spruce growth; (2) 2,400 two-year-old western yellow pine seedlings were planted for the root control project; and (3) 2,000 western white pine trees were set out for a comparison of age classes. Each of the 6,400 trees has been individually marked with a stake to facilitate later records.

At the field station the model plantation established last spring gave every promise of high survival, judging from an early June examination. A survival count made this month, however, revealed the fact that only about 42 per cent of the plantation is still alive. From June 15 on the weather was extremely dry. A close examination of the dead seedlings forces the conviction that approximately 95 per cent died since that date. Evidently a fairly good early season establishment was followed by a poor survival. To insure against adverse growing conditions, the establishment period should be increased to the possible maximum by early planting before the spring growth of root hair.

The tagging and measurement of the dense understory, chiefly red cedar, in the control plot of the 1914 series of thinning plots was accomplished. There are over 1,000 stems per acre one inch or over in diameter breast height under the 65-year-old overwood. The systematic observation of such an understory will give us a better understanding of its current and future behavior and value wherever found in similar stands of the white pine type.

Messrs. St. Clair and Parlow of the British Columbia Forest Service visited the Priest River Branch Station in company with Supervisor Whitham. Their chief interest centered around methods of cutting with special reference to the inferior species problem. Mr. A. Grasovsky from the Western blister rust control office visited the station to study the western white pine type.

SOUTHERN FOREST EXPERIMENT STATION

General

This period was marked by the resumption of field work after the summer's long office season.

Hine resigned on October 9 to become State Forester of Louisiana. In the four years he has been with us he has developed, through his enthusiasm and devotion to the work, into a valuable member of the organization, and his going is a severe blow to us. We have the satisfaction of knowing, however, that he is working side by side with us in another field.

A highly successful meeting of the Southern Forest Research Advisory Council was held on September 16. The attendance was representative and surprisingly large. Three members of the committee are in Europe. A thorough interest was displayed in the work of the station, and considerable forest research by other agencies was reported. One or two minor modifications of our program were recommended, and the committee adopted a recommendation to the Secretary of Agriculture that a pathologist and an entomologist be added to the Station staff as soon as possible. The Committee

was unanimous in wishing to hold the next meeting, a year from now, in the woods, preferably at one of our branch Stations. A Naval Stores Committee was appointed to pass upon the naval stores program of the Station, which could not be formulated before the completion of the 1925 season.

The Station benefited greatly by a week's visit from Assistant Forester Clapp. Mr. Clapp was joined by Forbes in east Texas, where they were taken by the State authorities on a whirlwind tour of the newly established State forests in both the shortleaf and the longleaf types. These Forests look as if they would present an admirable opportunity for permanent sample plot work when the time comes, and we have been offered office facilities at Lufkin, from which the State fire work is now conducted. Mr. Clapp spent three days in southwest Arkansas with the extensive survey crew, to whom he made several very valuable suggestions as to methods and objectives. He completed his visit by two days in New Orleans, one of which was spent chiefly in discussion of the naval stores program with Forbes and Wyman.

Word from Mr. Mattoon that he was bringing some visitors to McNeill was made the occasion for carrying out at that point a long-planned field day for south Mississippi lumbermen, especially those who had contributed to our fence. The plan was highly successful, and for a day we and our cooperators showed our experiments with grazing and fire to representatives of lumber companies owning half a million acres. Several of the visitors accompanied Mattoon and Hadley the next day to Bogalusa for a review of our work and that of the Great Southern Lumber Company.

Fire

Before resigning, Hine completed his report on the Lane project and brought up to date the office work on his other fire projects. In the course of this work he has been making an interesting comparison of various methods of computing plot volumes. He plans to continue the closest sort of contact with particularly our field work in fire research, and it is fortunate that much of this is concentrated in Louisiana.

Wyman has just discovered that a control plot on one of our slash pine fire projects at Raiford was burned over, probably in March. A month earlier it had been impossible to reburn the fire line around the plot, which is supposed to receive protection from the State Prison Farm authorities.

Measurements

Hadley completed a revision of his tupelo manuscript.

Forbes succeeded in writing about two-thirds of the bulletin to accompany the Southern pine figures before being obliged to join the extensive survey crew in Arkansas. He has found it necessary to compile a considerable volume of material with which to convince the Branch that certain passages in his manuscript are not fairy tales!

Wakeley completed the measurement of last season's increment cores, and in the course of the extensive surveys, later described, we have made several hundred new borings. We have found plenty of areas on which to study released growth at breast height, but have had very little luck in locating lumbering operations on which to make complete stem analyses of released trees.

Management

Demmon combined and revised the working plans for all three of these studies on his return from Florida. The six weeks' work in Arkansas has been unusually fruitful. 1,000 chains of strip were run in five selected localities, each representative of typical conditions over a considerable area. In other words, instead of running a few chains of strip through each of a very wide variety of conditions, just as we happen to meet them, we have endeavored to obtain a worth-while body of data at selected points. On each important area we have had a competent local guide; at Crossett, Mr. Williams, the forester for the Crossett Company; at Sheridan, the local Long-Bell firewarden; on the Arkansas National Forest, Junior Forester Streinz; on the lands of the Dierks Lumber Company, William L. Hall, consulting forester; etc. In spite of this local guidance the actual amount of strip run has been less than anticipated, since it has been hard to explain to those unacquainted with our methods just what we wanted most to see. A couple of miles of strip were also run in Oklahoma. At Mr. Clapp's suggestion we have not failed to vary our methods in order to pick up valuable information of kinds and by methods not anticipated at the time the working plans were prepared.

Shivery continued work on the Bogalusa Mc report and made a special trip to the Florida National Forest to recount the longleaf seedlings in our natural reproduction study there. He reports heavier losses in the shade of the oaks than in the open, which is the reverse of our experience up to this time. As if a temperature of 106° in the shade was not sufficient, he unfortunately discovered a fire burning on the Forest.

Naval Stores

Routine work kept Wyman, Byrne, and Henry busy. Late-season chips were collected for Miss Gerry. Wyman examined some of the foreign literature of which he made a list while in Washington, and finds surprisingly little French material of value to our investigations, but more in the German literature. The rather fundamental studies which he has been making this past season in an attempt to relate gum flow to climatic conditions have yielded some interesting results already, and both he and Mr. Clapp are enthusiastic over the future of these investigations.

Forestation

Seed collection for an enlarged program of seed extraction, germination tests, and comparison of strains from various parts of the South, has proven unexpectedly difficult. Droughts during either 1924 or '25 have

made longleaf seed practically unobtainable except in east Texas, and slash seems even scarcer. Loblolly and shortleaf have been obtained from several sources with less difficulty. Seed samples have been sent to a number of colleges for testing, as in previous years.

An additional planting site of ten acres has been assigned to us by the Great Southern Lumber Company for this year's planting work.

APPALACHIAN FOREST EXPERIMENT STATION

October, 1925

General

Mr. Clapp wound up his swing around the experiment stations with a stop at Asheville on October 19-21. In spite of the brevity of his visit inspections were made of the sample plots in the fire study and methods of cutting sample plots at Bent Creek and of the current work being done there by McCarthy on the relations of climate to inflammability of litter.

About 180 plants of Castanopsis delavayi, raised at Bell, Md., from seed collected in Yunnan Province, China, by Mr. J. F. Rock, were received from the Bureau of Plant Industry. About 150 of them were set out at several places in the Bent Creek investigative area and the rest in Asheville. All were mulched to protect from freezing.

McCarthy's presence at Bent Creek on the inflammability study supplied an opportunity for work under his direction on some deferred improvements in and around the field laboratory. The road to the building from the paved highway was improved and extended. The fire hazard from brush and leaves immediately around the building was reduced by some cutting and burning, defective and unsightly trees were removed, and the attractiveness of the surroundings generally increased. The laboratory now furnishes a base for the field work under way on the investigative area at Bent Creek. Without it this work would be very difficult.

Visitors during October included Dr. Daigaku Numata of Kyota, Japan, who is engaged in pathological work; Donald Bruce; and Lloyd Austin of the Eddy Tree Breeding Institute.

Inflammability of leaf litter as affected by weather conditions - Pf-2

About October 1 McCarthy took over the supervision of the meteorological stations at Bent Creek, which have been in charge of Mr. St. George of the Bureau of Entomology during the summer.

These stations were established for use in several projects including forest insect investigations, the study of oak regeneration, and the study of dryness of leaf litter in relation to the several factors of weather. The latter phase is being continued by McCarthy during the fall fire season.

Record is being kept of rainfall, temperature, and humidity, at two stations, one on a north and one on a south exposure. Correlated with this a study of moisture content of litter is being carried on.

Out of the records of the current season should come more exact information as to the relative speed of drying on northerly and southerly exposures, the time required after a rain to produce a fire hazard, and some practical measures of leaf litter dryness.

Through the courtesy of the Northern Rocky Mountain Experiment Station, three duff hygrometers were obtained for tests in this region. Seven Bates evaporimeters are being used to furnish a check on the rate of evaporation.

Germination and early survival of important Southern Appalachian Oaks (Mr-2)

Acorns of the species which are being studied by Korstian at New Haven were collected by Haasis, and part of them were sent to Korstian, the remainder being stored on the forest floor at Bent Creek, under screen. These acorns, of Southern Appalachian origin, will afford a check on the New Haven experiments with Connecticut acorns of the same species, and are expected to make it possible to apply the general results more specifically to the southern mountain conditions. Korstian reports good progress on his work at Yale, with all four of the principal species of oak planted out in the nursery and a large series put through heat tests at different temperatures for different periods.

Drought study (Pw)

Haasis and Humphrey spent a day on the drought study sample plots, completing the details of plot establishment and taking further notes on the trees. An interesting development is the presence of new growth on some of the trees that suffered leaf loss earlier in the season. One tree each of red maple, silverbell, and black locust was seen bearing new shoots which had been produced since the middle of September.

Forest pathology

A meeting of chemists in the tanning extract industry was held at the Station October 17 to discuss plans for cooperation in the analysis of chestnut acidwood in various stages of decay. The study is being actively carried on for the Government by Dr. Humphrey. G. F. Gravatt of the Washington office, Bureau of Plant Industry, was present at the meeting. Arrangements were made for the analysis of wood samples at various tanning extract plants, the samples to be collected and prepared under the direction of Dr. Humphrey.

LAKE STATES FOREST EXPERIMENT STATION

The autumnal whirling of the leaves, the occasional snows, and temperature below zero brought our field season to a stop. At the end of the month all the field men returned to the Station.

The study of the comparative cost of logging small and large trees covered three distinct woods operations, one in Wisconsin and two in the Upper Peninsula of Michigan. The study is new, and a number of entirely new methods have to be worked out in computing the results.

In all there were collected data for 900 trees in the phase of sawing, 1200 logs for the skidding phase, 2400 logs in loading and railroad transportation. The sawmill phase of the study included the analysis of 3500 logs. In addition, 20 acres of sample plots were taken and the cost of production of 15 cords of cordwood was analyzed. The data of the woods operations are being worked up by the Station while the sawmill data are to be worked up by the Forest Products Laboratory. Under the cooperative arrangement we are to prepare first individual reports for each operation for the use of the timber owners and later the three operations are to be combined into one report. So far, the difference in the cost of logging small and large trees is even more striking than we had anticipated and should give most convincing data. The difference between this logging study and similar studies conducted in the Districts is that the logging costs with us are merely a means towards a different silvicultural handling of the forest, while in the several other studies the logging cost was an end in itself. Koroleff, who is the leader of the study, has been appointed Instructor in Logging at the University of Minnesota. The Station is bending every effort to complete the computation of the results before his transfer to the University.

The aspen-birch study was extended during the month to Wisconsin and was carried on by Kittredge in cooperation with the State rangers on contributed time. Two weeks were spent in the region of Trout Lake, one week around Park Falls, and one week around Brule. For the entire field season the total field data collected to date, including those on the Minnesota and Superior National Forests in June, covers 81 conversion plots and 20 yield plots. In addition the Cloquet Experiment Station has measured about 70 yield plots and obtained the volume of some 700 sample trees. For the first time, then, we have enough data for volume tables and for checking up the existing volume tables. Balsam fir was found to be the most aggressive conifer in the conversion process of aspen stands to coniferous stands. So far it is estimated that less than 10 per cent of the aspen-birch type in northern Wisconsin is being converted to conifers naturally, the rest remaining aspen stands, and their conversion, if found desirable, must be brought about through artificial planting.

In anticipation of a bad fire season in the fall, a series of field studies of forest fires was planned in cooperation with the Minnesota Forest Service. The weather, however, turned out very favorably and there was no opportunity for carrying out the study of forest fires on the ground. Instead, the punching and verifying of the individual fire report punch cards for Minnesota for 1915 to 1923, inclusive, about 6,200 cards in all was completed. These are in addition to the 7,600 cards sent to Washington for tabulation last spring. In October the addition of another temporary man to the staff made it possible to take up again the fire weather study and to complete the tabulation of the available precipitation data for Minnesota. An attempt is now being made to determine the relation between precipitation and the occurrence of fires by ten-day periods as a basis for working out the probability of occurrence of effective rains.

Partial drainage of swamps greatly increases the growth of the swamp forests in the northern Lake States. This is clearly indicated by a number of specimens brought in by Wackerman from several timbered swamps which had been drained some time ago. The trees in one swamp, known as Williams swamp, a few miles northwest of Duluth which was drained in 1918 for agricultural purposes and then abandoned, showed an increase in diameter and height growth of several hundred per cent.

Another drained swamp at the North Central Agricultural Experiment Station at Grand Rapids, Minnesota, also reflected improved growing conditions in the increased growth of the trees. This swamp was tile drained in 1910 and a complete record of conditions before and after drainage is available.

At a number of other localities trees were examined on drained swamps and these areas will be examined more closely during the next field season. Twenty-four tree sections were sent back to the Station from Williams swamp and two whole trees, a tamarack and a black spruce, were brought back from the Grand Rapids swamp. These specimens will be carefully analyzed this winter to show the exact response of the swamp species to improved growing conditions brought about by drainage. In addition nearly a hundred references to the literature on swamp forests have been catalogued for future study.

The leaf fall in two stands was collected at Cloquet this fall from the leaf litter plots. The 100-year-old Norway stand had cast nearly a ton of litter per acre to the ground up to the time it was gathered. This is not the entire leaf fall for the year, as there were a number of browned leaves on the tree to come down during the winter and spring. The amount may well approach a ton and a half per acre per year. In the 50-year-old jack pine stand, 1400 pounds had fallen per acre. The plots at Cass Lake

were covered with snow and the litter was not collected from them. Wackerman returned to headquarters on October 29, leaving the north in a blizzard with a temperature 7 degrees above zero.

Zon spent some time the early part of the month in Cloquet in connection with the plans for winter cutting on the Cloquet Forest and with Wackerman on the swamp study north of Duluth. At the end of the month he went to Seattle to participate in the dedication exercises of the new forestry building at the University of Washington, where he gave an address on "The Need of Forest Research." While in the West he attended the Pacific Logging Congress. On his way back he visited the Pacific Northwest Forest Experiment Station, the Forest School of the University of Idaho at Moscow, Idaho, where he spoke four times during the day, and Missoula, where he spoke at a luncheon of the Rotary Club.

He was greatly impressed with the remarkable growth of the western forest schools and their plans for forest research. If the eastern and middle western forest schools do not show greater progress in the future than they have in the last decade, they may find themselves greatly outstripped by the western forest schools. Another impression that he brought back from this trip was that of the difficulty in developing real silviculture in the west, as long as the industry is confronted with the problem of removing heavy stands of timber of enormous sizes. In the west, silviculture is absolutely dominated by the logging problems. There, silviculture, even on the National Forests, is by necessity a slave of present logging practice.

On the 12th of October the Station was moved to new and more permanent quarters. At the removal of the Division of Dairying to the new Dairy Building, the old Dairy Hall was remodeled and the Station assigned five large rooms on the first floor in one end of the building. The new quarters are a considerable improvement over the old ones, not only on account of space but also because of the separation as a distinct unit from the Forest School, if we can live down the reputation of the old Dairy Hall, some of our letters coming addressed as follows: "Dining Hall, Dairy Barn, Lake States Forest Experiment Station." The barn and the stalls, however, are entirely comfortable, and the inmates are happy.

CLOQUET FOREST EXPERIMENT STATION

The month of October was spent in routine work. No new projects were started. A count of the ten-year-old planting plots was taken. A check was also made of the white pine underplanting released last year. The portion of the planting released showed no gain in growth over that still covered by the rather open stand of mature jack pine.

Two cutting operations have been laid out and started for the winter. One is a clean-up cutting in an open mature stand of white, Norway, and jack pine. Here the open character of the stand has allowed a great deal of hazel and alder brush to come in. The stand of brush and herbaceous cover is sufficiently heavy to prevent reproduction. It is planned to install a number of experiments in brush treatment to determine the best method of bringing back a coniferous stand by natural means.

The other cutting operation is a cordwood chance in a stand of dead tamarack. The tamarack is both standing and down. It is planned to take out all sound material in long lengths and haul it to the station wood yard. Here it will be sawed into 16-inch wood and sold on the ground at $4.50 to $5.00 per cord. A good market for this type of material exists and it should be possible to realize a profit on all the salvage operations on the Station area. The market is especially good in the spring and fall when the farmers of the surrounding country are too busy to haul wood to town.

The early winter which began in the middle of October has put a stop to all field operations except logging.

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